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MODELING, ECONOMETRICS, COMPUTERIZATION

Modeling of Interbranch Complex Formation Methodology Proposed

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[Article by Yu. Krivov: "Aspect of Using the Input-Output Balance as the Basis for Studying Formation of Complexes"]

[Text] Under present conditions increasing the degree of intensification of the economy depends to a considerable extent on optimum decisions in the realm of structural policy, decisions aimed at attaining the highest end results from the standpoint of the national economy. Effectiveness in implementing those decisions is largely determined by the factor related to the compatibility and balance of sectoral production structures. Economists have accordingly been more interested in recent years in problems of analyzing the structure of intersector complexes. The transition to target-program methods of planning has posed for planning agencies many problems of a methodological nature whose solution is crucial to the economic results from the functioning of the particular intersector systems.

In the context of the growing scale of social production, its ever deeper specialization, and the development of intersector production relations on that basis, the formation of intersector complexes is a natural economic process. At the present time this process is being reinforced by corresponding organizational structures. For instance, USSR Gosagroprom embraces more of the agroindustrial complex; USSR Gosstroy embraces a sizable portion of the construction complex, within the USSR Council of Ministers bureaus have been created for machinebuilding, for the fuel and energy complex, and for social development. The new intersector management components have been created as a rule on the basis of existing organizational structures. At the same time the process whereby intersector relations in the national economy become deeper and more complicated is continuous in nature, and it requires a thorough study using nontraditional methodological approaches and the up-to-date methods of mathematical economics. The present article contains the author's recommendations on the use of retrospective intersector balances in analyzing the composition and boundaries of intersector complexes.

The process of the formation of the complexes and the structure of basic intra- and intercomplex relations can be represented in the form of a block diagram. On that diagram physical production is broken up into its three basic stages. In the first stage all production is directly related to the development and exploitation of natural resources, the initial raw material and supplies are extracted or produced, and there are practically no

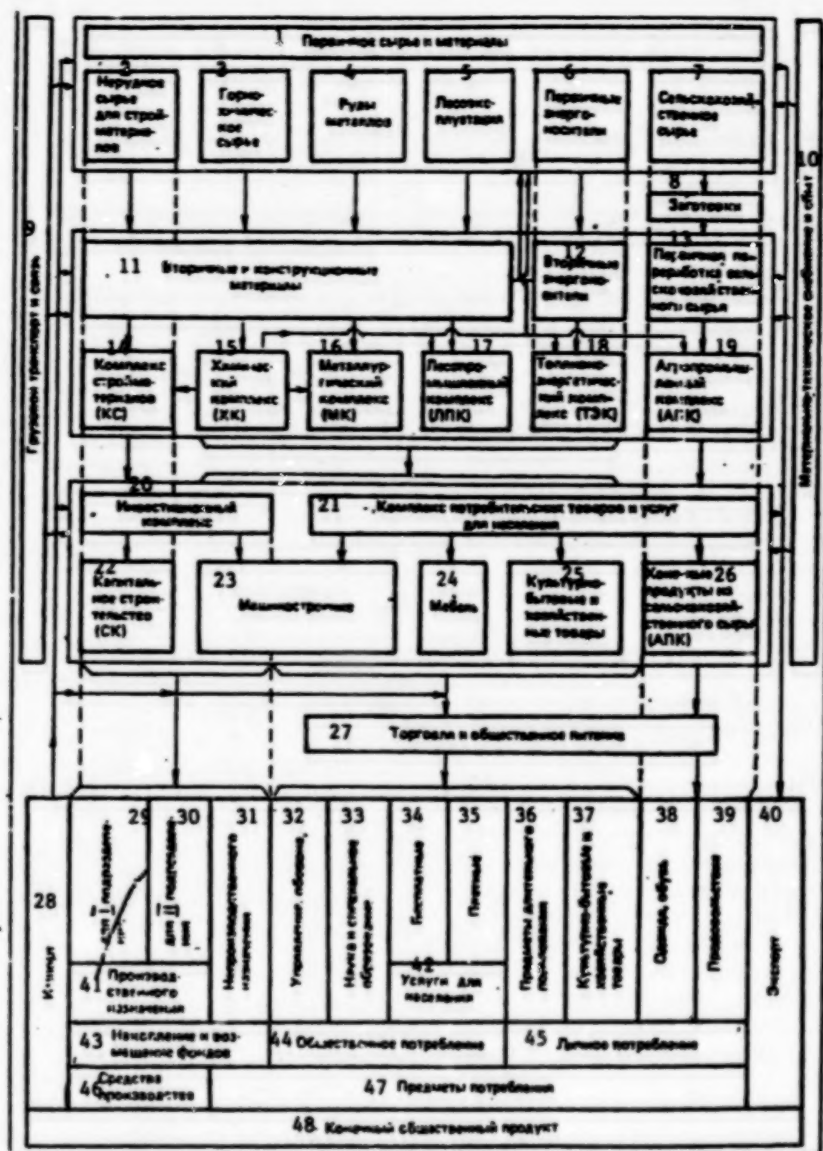
intersector relations. But each of the sectors given separately on the diagram represents a nucleus around which national economic complexes are formed in the next stage of production. That is why it is quite allowable to refer to the sectors in the first stage as the "nuclei of the complexes."

In the second stage of production the initial raw material is turned into intermediate products. It is here that the process of the formation of complexes and development of intra- and intercomplex relations takes place. In this stage six groups of sectors are brought together on the principle of the "nucleus of the complex." In addition, four groups of sectors can be unified in a single macro-complex "Secondary and Structural Materials" on the basis of the degree of finishing of their products and the direction of their subsequent use. Among the peculiar features of this stage of production we should single out the high level of intensification of intercomplex relations of the fuel-and-energy complex and chemical complex and the relative separateness of the four other intersector formations.

The third stage is represented by two macrocomplexes producing a finished product: the investment complex and the consumer goods complex. In these stages the relation between the original raw material and the end product produced from it is lost for many sectors. There is an exception in the product of the construction complex and agroindustrial complex, in whose production cycle the connection between the initial raw material and the finished products for consumption is rather obvious. To some extent this relation can also be traced for certain other sectors.

But it is preferable, in our opinion, for the sectors in the third stage of production to be divided according to the basic final needs of the national economy. One of the possible versions for the detailed breakdown of use of the end product by purposes is represented in the fourth stage on the diagram. Since each of these purposes expresses a certain need that serves as the purpose for the functioning of the economy and the group of sectors satisfying that need (the sectors directly related to that purpose) along with sectors supplying them with means of production, comprises a purposive national economic complex.

Thus the initial points of departure in studying the processes whereby complexes are formed may either be the sectors producing the initial raw material (the "nuclei of the complexes") or the specialized orientation of the use of the end product ("objectives of the complexes"). It makes sense on this basis to single out two basic principles for breaking down the national economy into intersector complexes: the principle of the "nucleus of the complex" and the principle of the "purpose of the complex."



Key:

1. Primary raw material and supplies 2. Nonmineral raw materials for building materials 3. Mining and chemical raw materials 4. Metallic ores 5. Timbering 6. Primary energy carriers 7. Agricultural raw materials 8. Procurements 9. Freight transportation and communications 10. Material and technical supply and sales 11. Secondary and structural material 12. Secondary energy carriers 13. Primary processing of agricultural raw materials 14. Building materials complex (KS) 15. Chemical complexes (KhK) 16. Metallurgical complex (MK) 17. Wood products complex (LPK) 18. Fuel and energy complex (PEK) 19. Agroindustrial goods and services for the public 22. Capital construction (SK) 23. Machine building 24. Furniture 25. Durable consumer goods, housewares, and household chemical products 26. Finished products from agricultural raw materials (APK) 27. Trade and the food service industry 28. Imports 29. For Department I 30. For Department II 31. For nonproduction purposes 32. Administration, defense 33. Science and specialized education 34. Free 35. Paid 36. Durable consumer goods 37. Housewares, sporting goods, and household chemical products 38. Clothing, footwear 39. Food 40. Exports 41. For production purposes 42. Services for the public 43. Accumulation and replenishment of stocks 44. Social consumption

Selection of the point of departure depends entirely on the purposes of the study. (See graphic on page 2.) The principle of the "nucleus" in the formation of complexes is widely used: specifically in analyzing the adequacy of supply of the national economy with scarce raw materials, the influence of the variation in the volume of its production on performance of particular final objectives of economic developments, discovery of the principal directions for conservation of that raw material, efficiency of application of progressive technology for conserving that resource by its principal consumers, and so on. The principle of the "objective" in the formation of complexes makes it possible to identify sectors that are taking direct part in satisfying particular final needs of the national economy, their role in attaining the general purpose of production, the economic relations among partners in the complex, and a number of other matters. It is obvious that in its economic nature the principle of "objective" corresponds more to those tasks of economic policy which the party is setting for the country's national economy in the present stage. In the study of the processes of formation of complexes one of the central questions is that of methods of evaluating their performance. Most economists believe that the indicator of the complex's end product must be used as the principal criterion in evaluating the results of production. But the composition of this indicator is not always treated the same way by any means. In our opinion, two methods of computing the final product of the complex correspond to the two principles of formation of complexes. When the principle of the "nucleus" is used, it is advisable to use the indicator of the end product that is calculated by the sectoral method, i.e., as the value of the output of the complex minus material costs within the complex. The end product calculated by the national economic method, i.e., as the value of the output of the complex which falls outside the limits of current consumption in production, best corresponds to the principle of the "objective."

The end product of any complex of the national economy consists of two parts which differ in their economic content—the portion which goes to serve the objective and the portion which goes for reproduction. The first of them characterizes the level of satisfaction of the need of the national economy for the product of the complex, while the second supplements this description with the conditions for expanded reproduction of the sectors in the complex. A line of demarcation needs to be drawn between these two parts of the end product of the complexes because the question of the functional efficiency of a particular complex can be settled only on the basis of computation of the end product expressing its payoff

function. Determination of efficiency on the basis of both components of the complex's end product can seriously distort the results, since the volume of the end product may increase thanks to an accumulation of resources and subjects of labor for the branches of the complex, while the production of its products destined for satisfying its particular needs of the national economy has been stable or has dropped off. In economic practice there have been quite a few such trends in development of intersector complexes.

The existence of the two points of departure in studying the processes of formation of complexes makes it necessary to work out specific methods of breaking down the national economy into intersector complexes.

The method based on selecting from the block of sectors in the first stage of production the sectors of the "nucleus of the complex" and on using some algorithm to identify those processing or manufacturing sectors in the second stage of production that are most closely related to this "nucleus" as well as its role in furnishing physical resources to the intersector complexes in the third stage of production corresponds to the principle of the "nucleus of the complex."

This method is being used effectively at the present time by most researchers. The research is conducted as a rule on the basis of an intersector balance. The coefficients of the intersector distribution of products are used as the criterion of the connection:

$$h_{ij} = x_{ij}/X_i,$$

in which x_{ij} —volume of delivery of the product of the i -th sector-supplier to the j -th sector-consumer;
 X_i —total volume of production of the product of the i -th sector-supplier.

The process of finding the most essential connections with this method of investigation is iterative in nature.(1)

In our opinion, it is preferable to use coefficients of full material costs for these purposes. First of all, they embrace the entire system of direct and indirect intersector relations; second, they are more stable in dynamic terms than the intersector flows and the coefficients of direct inputs and distribution; third, they express the direct relation between the volume of production and the end results for the national economy. But even the coefficients of full costs are essentially differentiated by sectors and by regions within a single sector, and they are also subject to fluctuations from year to year under the impact of various factors.

The following relationships, which we call coefficients of intersector compatibility (kompleksirovaniye) (K_j) are more stable and comparable from the dynamic, intersector, and regional viewpoints:(2)

$$K_j = b_{1j} / \sum_j b_{1j} : b_{jj} / \sum_j b_{jj} = b_{1j} / b_{jj}$$

$$K_i = b_{ij} / \sum_i b_{ij} : b_{ii} / \sum_i b_{ii} = b_{ij} / b_{ii}$$

in which b_{ij} —nondiagonal coefficients of full material costs of the i -th sector in production of the end product of the j -th sector;

b_{ii} and b_{jj} —diagonal coefficients of full material costs within the sector to produce the end product of the j -th and i -th sectors, respectively.

On the basis of the formulas given, the first indicator is obtained by dividing the elements of the column of the matrix of coefficients of full costs by the diagonal element of that column, and the second is obtained by dividing the elements of the row of the same matrix by the diagonal element of that row. Both indicators reflect the relation between the unit of the end product, i.e., the higher K_j or K_i , the more substantial is the contribution

of the sector-supplier. Here K_j corresponds to the physical aspect and K_i the value aspect of relations between the suppliers and consumers of the product.

An analysis of the process of formation of complexes begins with the "nucleus of the complex" and is iterative in nature. In the first stage those sectors are selected which are the largest consumers of the product of the primary processing of the "nucleus," and so on.

It is also advisable to apply these coefficients in analyzing the regional specialization of national economic complexes. It is a peculiarity of regional intersector complexes that a given region may enter into exchange with other regions of the country not only the initial raw material and intermediate products, but also the end products of a particular complex. The magnitude of the coefficients of intersector compatibility in various stages of production varies substantially as a function of this aspect. That is why interregional comparison of the coefficients may give a sufficiently complete idea about the specialization of a complex in a regional breakdown. This is confirmed by the figures in Table 1, where the relation between the full costs of the product of cropping in particular processing sectors of industry and the consumption of the products of cropping within the sector (K_i) is given for certain regions of the country.

Table 1

Sectors Processing Products of Cropping

	1	2	3	4	5
Cotton	0.004	0.828	0.011	0.005	0.696
Winemaking	0.053	0.417	0.389Tc0.265	0.152	
Fruit and vegetable	0.333	0.724	0.567	0.582	0.455
Milling and rolling	0.774	0.657	0.686	0.453	0.681

The figures in Table 1 show in particular that the cotton grown in Regions 2 and 5 goes through primary processing at cotton gins located in the same region. Moreover, the level of the coefficient indicates that production in Region 5 depends to a lesser degree on the value of the agricultural raw material and is correspondingly more oriented than Region 2 toward the manufacturing of finished fabrics. The three other regions obviously do not have their own cotton ginning industry. At the same time, Region 1, for example, is the largest producer of finished cotton fabrics, but their production has practically no connection to its agriculture, and the raw material for the cotton industry of Region 1 is supplied from other regions of the country. Thus the coefficients of intersector compatibility reflect the territorial division of labor that has taken place in the country's cotton complex.

An analogous analysis can be made in a regional breakdown for other sectors as well.

This method fully embraces the movement of physical product flows. But it does not afford the possibility of

identifying sectors that furnish the intersector complex its basic production stocks, i.e., the sectors building up stocks. For these purposes we can use the intersector balance of fixed capital, in particular, coefficients of the full capital intensiveness for the particular aspects of fixed capital. Since full capital intensiveness of the product is proportional to its full materials intensiveness, this method is based on the previous one and supplements it. In addition, here we are establishing the direct relation between the sectors supplying stocks, the "nucleus of the complex," and sectors producing end products from the primary raw material. For the purposes of such an analysis we select the type of capital that is the main type for the "nucleus of the complex" (in the APK, for example, tractors and agricultural machines, and then we identify sectors that have the highest level of full capital intensiveness with respect to that type of fixed capital. Since direct capital intensiveness with respect to the capital of the "nucleus of the complex" in the processing sectors is not high as a rule, a substantial magnitude of full capital intensiveness for that type of

Table 2 (in rubles per 1,000 rubles of output)

Branches of Industry	Full Capital Intensiveness of Tractors and Agricultural Machines		
	1966	1972	1977
Woolen	49.42	65.08	81.48
Sugar	72.07	66.04	108.73
Fruit and vegetable	73.50	75.84	92.90
Meat	202.70	276.01	323.90
Dairy	131.80	161.38	216.83
Milling and rolling	123.90	152.77	184.48

capital provides the basis for bringing together the capital-forming and processing sectors identified to create a complex bound up with this "nucleus." To illustrate, we will give figures on the dynamics of full capital intensiveness for tractors and agricultural machines in certain branches of industry processing agricultural raw materials in one of the country's economic regions (Table 2).

It is evident from the figures given in Table 2 that the full capital intensiveness of tractors and agricultural machines has increased in all the branches of industry processing agricultural raw materials. Even the extremely bad weather conditions for agriculture in 1972 had little influence on this process. At the same time, the rise in the capital intensiveness in processing branches exceeded by 1.5-2-fold its growth in agriculture, which indicates intensification of integrational processes in the agroindustrial complex.

Thus the matrices of coefficients of full costs of the intersector balances of the social product and of fixed capital allow us to study thoroughly the closeness of intersector production relations, to divide up the national economy into blocks of interrelated sectors on the basis of the principle of the "nucleus of the complex," and to analyze the directions in specialization of regional intersector systems and other aspects of the formation of complexes.

The study of intersector complexes on the principle of the "objective" is based on using as the criteria of their formation the purposes in the national economy for which the end product is used. This approach, in our opinion, is most appropriate to the period of restructuring the economy in the direction of an intensive development strategy and attainment of high end results from the standpoint of the national economy.

There are several stages in the algorithm to determine the sectoral composition and volume of output of complexes. Depending on the problems of the study, in the initial stage consumption funds and funds for nonproduction consumption of the end product are divided among several purposes. One of the examples of this kind of division is given in the block diagram. The physical form of each of the purposes may be represented in this case in the form of a group of specialized branches expressing the end result of the functioning of the particular complex.(3)

In the next stage the sector-claimants producing subjects of labor for the specialized part to the end product of this complex are identified. The calculation is made according to this formula

$$X_k^Z = (E - A)^{-1} Z_k, \quad (1)$$

in which X_k^Z --vector of the volume of gross product required to realize the k-th specialized result of production;

Z_k --vector of the volume of the end product characterizing the result in fulfilling the specific purpose;

$(E - A)^{-1}$ --matrix of coefficients of full material costs.

$$\alpha_1^k = X_{k1}^Z / X_1 : X_k^Z / X, \quad (2)$$

in which X_{k1}^Z —volume of production of the i-th sector expended in production of that portion of the end product of the k-th complex that goes to serve the objective;

X_1 —total volume of gross output of the i-th sector;

X_k^Z —volume of the gross social product expended to produce the portion of the end product of the k-th complex that goes to serve the objective;

X —total volume of the gross social product.

↑
The sector-claimant belongs in the given complex if $\alpha_1^k > 1$.

$$X_k^N = (E - A)^{-1} N_k, \quad (3)$$

in which X_k^N —vector of the volume of gross product necessary for expanded reproduction of the k-th specialized complex;

N_k —vector of accumulation and replacement of retirement of fixed capital of sectors included in the k-th complex in the previous stage.

The coefficient for sectors not included in the complex in the first stage is calculated once again for final determination of the makeup of the complex:

$$\beta_1^k = (X_{k1}^Z + X_{k1}^N) / X_1 : (X_k^Z + X_k^N) / X.$$

This calculation yields the volume of output of the gross product of various sectors to produce that portion of the end product of the complex being studied which serves its particular purpose. Sectors directly related to this complex are determined according to Formula (2) above.

Capital-forming sectors are selected to study the reproductive aspects of the functioning of the complex for the set of sectors singled out in the second stage. For the sectors included in the complex the volume and physical composition of accumulation and replacement of retirement of fixed capital are calculated along with the growth of the elements of working capital.

Then we compute the volume of the gross output of the sector that goes to maintain existing capacities and to expand the production of the product of the complex, using Formula (3) above.

In the final stage the resource-producing, processing, and capital-forming sectors are brought together to comprise the unified intersector complex.

Since a particular sector may be assigned to only one of the intersector complexes, it is advisable for division of the national economy into complexes to begin with breaking down the end product among the most important directions of use and then moving on to the iterative process we have described. This approach makes it possible in each iteration to compare the share of the gross output that pertains to the various complexes. Here the decision to place the i-th branch in the k-th complex is taken only if

$$\beta_1^k > \beta_1^r > \dots > \beta_1^s$$

(k, r, s—numbers of complexes).

We have used the methodological principles set forth in calculations of the principal indicators of the agroindustrial complex of one of the economic regions of RSFSR on the basis of the intersector balance.

It is well known that the functional purpose of the APK is the fullest satisfaction of the needs of the public for foodstuffs, clothing, footwear, and other consumer goods

derived from agricultural raw materials. On the basis of this definition all the sectors of light industry and the food industry and also agriculture for the following directions of use of the end product: personal and social consumption, exports to other republics, and other expenditures.

These elements made up the portion of the end product of the APK related to its specific purpose. In the next stage accumulations of fixed and working capital, replacement of fixed capital retired, and major repairs of fixed capital, i.e., the portion of the end product of the APK that goes for reproduction, were calculated for these sectors. For purposes of comparison an analogous calculation was made in accordance with the method and the sectoral makeup adopted in USSR Goskomstat. The structural characteristics of the end product calculated by the two methods are given (in percentages) in Table 3.

It is evident from the figures in Table 3 that in the structure of the end product calculated according to the proposed method the share of the portion for the specialized purpose, taking exports into account, amounted to 82.1 percent of its total volume, or 3.3 percentage points more than according to the accepted method. The share of the output of the complex in the total volume of the end product and especially in the consumption fund is considerably higher (by 21 points). In other words, the proposed method reflects more vividly the specific orientation of the APK toward an objective and its role in the republic's economy.

On the whole, the volume of the end product of a complex calculated according to the method proposed is 37 percent higher than the volume computed according to the accepted method, including a 39-percent difference for the portion applied to the specific purpose, 16 percent for the reproductive portion, and 2.2-fold for exports.

In the last stage, after the matrix of coefficients of full material costs has been multiplied by the vector of the end product of the complex, the final sectoral composition of the APK was determined. The calculation showed that on the average about a fourth of the value of the output in the complex went for production of the end product of the sectors of the complex related to the particular purpose and to their expanded reproduction. This level was exceeded only by a small portion of the sectors, and they were included in the composition of the first sphere of the APK. By contrast with the accepted sectoral composition, production of wooden and paper containers, chemical fibers and filament (as a resource supplementing agricultural raw materials for light industry), and equipment for light industry were included in the complex. All of these sectors were included only in the volume of deliveries of output to the complex. In addition, by contrast with the accepted method, the volume of capital construction was reduced by the value of construction of facilities in the first sphere of the APK and rural construction of nonproduction projects. Timber and lumber is an industry that was left out of the complex since it has no relations with it.

Table 3

Indicator	Relative Share of Output of APK in Total Volume of End Product		Structure of End Product of APK	
	According to Accepted Method	By Author's Method	According to Accepted Method	By Author's Method
End product of APK— total	34	47	100.0	100.0
Breakdown:				
Consumption fund (portion of end product that goes for particular pur- pose)	54	75	74.2	75.2
Funds for accumu- lation and replace- ment of retired assets (portion of end products for reproduction)	20	23	21.2	17.9
Further breakdown:				
For first sphere of APK	42	—	1.5	—
For second sphere of APK	99	99	12.6	9.2

Table 3

Indicator	Relative Share of Output of APK in Total Volume of End Product		Structure of End Product of APK	
	According to Accepted Method	By Author's Method	According to Accepted Method	By Author's Method
End product of APK— total	34	47	100.0	100.0
For third sphere of APK	85	88	6.3	6.6
For APK as a whole	86	82	20.4	15.8
For sectors not part of APK	1	4	0.8	2.1
Export	10	20	4.6	6.9

As a result of the calculation made the value of output of the complex turned out to be 33 percent higher than when it was calculated according to the accepted method, the size of the labor force was 23 percent greater, and the value of fixed productive capital was 23 percent greater.

Thus the proposed methodological principles and methods procedures make it possible to use the intersector balance to discover the most stable intersector production relations and to make a comprehensive study of the process whereby the complexes take shape. In our opinion, it will help to increase the scientific soundness of the structural restructuring of the economy and will contribute to more thorough work on the comprehensive national economic target programs.

Footnotes

1. See, for example, M.Ya. Lemeshev and A.I. Panchenko, "Kompleksnyye programmy planirovaniya narodnogo khozyaystva" [Comprehensive National Economic Planning Program], Moscow, Ekonomika, 1973, p 40.

2. The coefficient K , was first proposed by E. Yershov, but its content was treated differently. See E.B. Yershov, "Mathematical Methods in a Static Model of the Intersector Balance," in the book "Metody planirovaniya mezhotraslevykh proporsiy" [Methods of Planning Intersector Proportions], Moscow, Ekonomika, 1965, pp 42-45.

3. V.M. Masakov has also recommended that the group of specialized sectors be identified in the initial stage of the study, but the algorithm for determining the sectoral composition of complexes differs fundamentally from the one we have proposed. See V.M. Masakov, "Sotsialisticheskoye proizvodstvo: otraslevaya struktura i dinamika" [Socialist Production: Sectoral Structure and Dynamic Behavior], Novosibirsk, Nauka, pp 30-34.

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AGRO-ECONOMICS, POLICY, ORGANIZATION

Family, Private Plot Contract Application Proposed

18240360 Moscow *EKONOMIKA SELSKOGO
KHOZYAYSTVA* in Russian No 8, Aug 87 pp 90-95

[Unattributed material under the rubric "Official Materials": "Recommendation for the Employment of the Family and Individual Contract in Agriculture"]

[Text] *Below are the Recommendations for the Employment of the Family and Individual Contract in Agriculture that have been approved by the USSR State Agro-Industrial Committee and the USSR State Committee on Labor and Social Problems and have been coordinated with the All-Union Central Trade-Union Council.*

1. General Provisions

1.1. The family and individual contract can be employed on kolkhozes, sovkhozes and other agricultural enterprises in all sectors of agricultural production.

1.2. Kolkhozes, sovkhozes and other agricultural enterprises conclude agreements with families or individual parties for the production of products or the fulfillment of individual agricultural operations (Supplement 1). The agreement is signed on behalf of the farm administration (customer) by the manager or another authorized official, and on behalf of the contractor by all members of the family that are taking on obligations under the agreement. The family signifies a designated contractor to carry out mutual relations with the customer.

1.3. Kolkhozes, sovkhozes and other agricultural enterprises conclude agreements for family and individual contracts with the workers and employees of other enterprises and organizations, people taking courses and students when they have a certificate of release from their place of work or study that is issued by a communal-housing or other executive committee of the local Soviet of People's Deputies in the place of residence. Kolkhozes that conclude an agreement with another farm present a certificate that affirms the consent of the board of the farm for travel to work at other farms.

1.4. The assignment of the fulfillment of the work stipulated by the agreement to outside parties, enterprises or organizations is not permitted.

2. Contractual Obligations

2.1. An agreement for a family (individual) contract can be concluded for the production of agricultural products and the fulfillment of certain types of work.

2.2. The amount of products (work) produced is determined by the customer in concert with the executors.

2.3. Material and technical supply for the executor will be carried out by the customer. The customer herein can allocate and secure for the executor during the effective period of the agreement for the fulfillment of the production program envisaged in the agreement: individual plots of land, crops (plantings), hayfields, pastures and other types of land; full crop rotation; multi-year planting; livestock; animal-husbandry and other productive accommodations; tractors, trucks, other agricultural technology and equipment and sowing and planting material; feeds; fertilizers; pesticides and chemicals; implements, fuels, lubricants and other materials essential to fulfill the assignment.

2.4. The cost of the material and technical resources is determined in prices and by a procedure stipulated in the contract.

2.5. The contractor may make use any structures, tools and transport belonging to him to fulfill the production program. The farm, where necessary, renders him assistance under established procedure in the construction and equipping of accommodations for the maintenance of livestock and poultry; allots transport and technical equipment; renders services in cultivating the plot of land and the procurement and delivery of feeds; and, provides veterinary support for the livestock and poultry that are handed over for upkeep using his own manpower. The farm, at the request of the contractor, grants him an advance through USSR Gosbank credit for acquiring materials and small-scale mechanization equipment essential for production. Materials allotted by the customer and the cost of services are paid for by the customer.

3. Material Incentives

3.1. Compensation for the labor of the contractor is made by the customer in the form of payments for products produced or work fulfilled or in the form of procurements of the products produced by the contractor. The form and size of the compensation is stipulated in the agreement.

3.2. Payments for the products of cultivation and animal husbandry can be made: according to valuations per unit (value) of the product produced with a regard for its quality and delivery deadlines, according to standards (valuations) for the gross income received by the contractor or according to the standard cost of the products produced. Payment in kind is made under a procedure established by existing provisions.

3.3. The standard product cost includes the value of all material expenditures, customer services and the wage payments fund. The wage payment fund is calculated in accordance with the procedure stipulated for permanent sovkhoz workers according to the provisions of wage payments approved on kolkhozes. The value of material resources is determined according to plan accounting prices.

The standard cost is used to determine the total value of the agricultural products produced and given over to the customer. The difference between this amount and the value of the material expenditures made and services rendered is paid to the contractor as compensation for the ultimate results of labor.

3.4. Compensation in the form of procurements of products produced is employed in calculations with the contractors with which the ratio is established for the "Standard Agreement for the Cultivation in the Private Subsidiary Plots of Citizens of Livestock and Poultry Belonging to the Kolkhozes, Sovkhozes and Other Agricultural Enterprises" as approved by USSR Minselkhoz [Ministry of Agriculture], USSR Minfin [Ministry of Finance], USSR Minzag [Ministry of Grain Products] and the USSR TsSU [Central Statistical Administration] of 12 Mar 81, Nos 151-6.

3.5. Before the calculations for the products, the contractor may be paid an advance against the payments for the ultimate results of the work. The size of the advance and the time periods for paying it should be stipulated in the agreement, but in such a manner that it does not exceed the wage fund calculated for the worker according to the wage scales.

4. Responsibility for Observing the Terms of the Agreement

4.1. The contractor and the customer bear mutual responsibility, including material responsibility, for the observance of the terms of the contract as fixed in the agreement.

The contractor answers for: the production of the amount of work and the agricultural products by type and quality in the stipulated time periods as envisaged by the agreement; the rational utilization and preservation of fixed capital, animals, seeds, feeds, fuel, power and other material resources and the observance of requirements for labor and equipment safety.

The customer answers for: for the provision of material and technical resources, equipment, tools, seeds, feeds, fertilizers, and pesticides and chemicals for agricultural

crops and livestock and the rendering of timely agrarian, zoological and veterinary assistance in accordance with the agreement that has been concluded.

4.2. In the event of the customer's failure to fulfill his obligations that leads to a decline in the yield of the agricultural crops and productivity of the animals, the loss of crops and plague among animals, disruption of the fulfillment of stipulated assignments by the contractor, decline in the quality of products or work or the overconsumption of feeds or other material resources, the contractor has the right to make a claim against the customer. The procedure for reviewing it and the size of recompense to the contractor for losses is defined in the agreement.

4.3. The responsibility of the contractor for failure to fulfill contract obligations and causing material loss to the farm is implemented under the procedure envisaged in the agreement, as well as in accordance with existing legislation.

Supplement 1

[Note: "—" denotes blank spots for filling in questionnaire]

Acceptance Agreement for a Family (Individual) Contract for the Production of Agricultural Produce (Work)

The kolkhoz, sovkhoz (state agricultural enterprise):
———(name), ofrayon, oblast(kray, ASSR), republic:

herein called the "customer," in the person of
———(position, last, first and middle names)
on the one hand, and the family consisting of (the agreement may be concluded by workers (kolkhoz workers) for the production of produce (work) in the basic worktime, workers of the given farm or other enterprise and organization for the production of produce (work) in time off from work, retired people, students and housewives):

herein called the "contractor," on the other hand, have concluded this agreement on the following:

1. The customer proposes, and the contractor accepts, the obligation: 1.1. To produce agricultural products on the following scale:

Description of products with indication of qualitative parameters

19— (year) 19— 19— 19— 19—

[space provided for 4 responses]

To Carry Out Agricultural Operations:¹

Type of work	Unit of measurement	Amount	Time periods
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[Space provided for 5 responses]

¹ Filled in upon conclusion of the agreement for the fulfillment of individual agricultural operations (cycles).

1.2. To hand over to the customer all of the products produced or all work to be submitted to the designated recipient of the work.

1.3. To make efficient use of the land, animals, agricultural equipment and other means of production.

1.4. To observe the rules for the operation of equipment, veterinary requirements, rules for equipment safety and the protection of the environment. Not to permit the pollution of the environment or violations of the rules of land use.

1.5. To ensure the preservation of all of the productive facilities, animals, equipment, technology, implements, tools, materials and products produced that are transferred to him under the agreement.

1.6. To make timely declaration of the containers or transport granted—— or the designation of the commission for accepting work.

1.7. To account for expenditures and product removals.

1.8. Not to permit the attraction of the services of outside organizations, the rental of machinery, mechanisms, equipment, the assignment to other parties of the fulfillment of work stipulated in the contract.

1.9. To fulfill other requirements of the customer associated with the realization of his obligations under this agreement.

2. The customer is obliged:

2.1. To transfer to the contractor the basic means of production according to the document for the period the agreement is in effect.

2.2. To provide the contractor with the essential material and technical resources in the amounts, at the prices and in the time periods corresponding to Supplement 1.

2.3. Render to the contractor production, transport and other services in amounts, at prices and in time periods corresponding to Supplement 2.

2.4. Create the essential domestic and living conditions:——

2.5. Provide consulting on issues of technology, mechanization, economy and the organization of production and wage payments; provide the necessary analyses and veterinary support.

2.6. Provide for labor safety, instruction in equipment safety, fire protection, as well as issue protective attachments, special clothing and special footwear in accordance with norms.

2.7. Receive the products produced and work done from the contractor in timely fashion.

2.8. Organize the training of the contractor on issues of organization and wage payments, technology and the mechanization of production.

2.9. Provide an accounting of expenditures and product removals according to the indicators necessary to calculate material compensation.

2.10. In essential cases, at the request of the contractor, designate a replacement in case of illness, as well as the paid vacation of the contractor from the compensation due him.

2.11. Material compensation for the contractor for the products produced or work done in the following manner and on the following scale: [7 lines left for responses]

2.12. Determine the economy (excess) of direct expenditures on the products actually produced proceeding from the agreed-upon limit for direct expenditures per unit of product according to Supplement 3 (filled in in cases where the material compensation is made according to valuations per unit of product).

2.13. For contractors that are workers of the sovkhos (kolkhoz): (last, first and middle names) [2 lines left for responses]

the material compensation due them according to the final calculations, but no greater than 3 wage scales with a regard for the time worked, to pay into their personal accounts as wages, for which the stipulated supplemental payments for the skill classification and tenure by specialty on the given farm are deducted, for work in the regions of the Far North and regions equivalent to it, a regional factor is employed and payments are made on the general basis of bonuses from the material-incentives fund. Their work time according to the agreement is calculated in continuous tenure by specialty on the given farm for deducting pensions, disability stipends, vacation pay and other instances stipulated by law.

3. General issues.

3.1. The contractor independently resolves all issues in the organization of labor, the working and leisure regimen, accounting for the labor contribution of family members to the overall results of the labor and the distribution of the family earnings.

3.2. Taking into account the specific nature of the family contract, the parties agree that payments for overtime work or for weekly rest days are not made to the contractor.

3.3. The reworking or correction of work that is done through the fault of the contractor who digresses from agrarian or veterinary requirements is done at the expense of the contractor.

3.4. The effect of this agreement is extended to the whole period of the production of agricultural products (work) envisaged in Clause 1.1.

3.5. The customer has the right to abrogate the agreement in the event of the contractor's failure to fulfill the obligations he has taken on under Clauses 1.1-1.9.

3.6. The customer abrogates the agreement upon discovery of theft of products. In this case, material compensation for the ultimate results is not made.

3.7. The contractor has the right to abrogate the agreement in the event of the customer's failure to fulfill the obligations he has taken on in Clause 2.

3.8. The contractor has the right to make a claim against the customer if the failure to fulfill the obligations he took on himself led to a decline in the yield of agricultural crops, the productivity of animals, the loss of seed

or animals or the overconsumption of material resources. In the event the claim is accepted, the customer compensates the contractor for damages in the following manner and on the following scale: — [5 lines left for response]

3.9. The contractor answers by way of a reduction in the size of compensation, as well as recompense for material damages, for a failure to fulfill the obligations he has taken on himself in the following manner and on the following scale: — [3 lines left for response]

3.10. The designated contractor for the family is — (last, first and middle name)

3.11. Disputes between the customer and the contractor that arise in the course of the execution of obligations under the agreement are considered in legal proceedings.

3.12. This agreement consists of three copies: 2 copies to the customer and 1 to the contractor.

The — of —, 19—.

Customer — - Contractor — (signatures)

Supplement 1 to Sample Agreement

Material and Technical Supply for the Contractor				
Type measurement	Unit of provision	Time of	Amount	Price (rub -kop)

[6 lines left for responses]

The — of —, 19—.

Customer — (signature) - Contractor — (signature)

Supplement 2 to Sample Agreement

Obligations of the Customer in Rendering Production, Transport and Other Services to the Contractor				
Type measurement	Unit of	Times	Amount (rub -kop)	Price

The — of —, 19—.

Customer — (signature) - Contractor — (signature)

Supplement 3 to Sample Agreement

Limit of Direct Expenditures per Unit of Product Output		
Product description	Unit of measurement	Expenditure limit — total — including —

[Space left for 6 responses]

The — of —, 19—.

Customer — (signature) - Contractor — (signature)

CIVIL AVIATION

Discussion, Diagrams of Wide-Body Il-96-300

81442273 Moscow KRYLYA RODINY in Russian No 7, Jul 87 pp 34-35

[Article by engineer A. Shakhnovich: "The Aircraft of the 12th Five-Year Plan"]

[Text] Aircraft with the letters "Il" on the fuselage hold a prominent place in domestic and world aviation. In half a century of creative work, the collective of the Experimental Design Bureau imeni Sergey Vladimirovich Ilyushin—its organizer and manager for many years—developed a large family of aircraft for the country's Air Forces and civil aviation. All the piston, turboprop and jet aircraft of this OKB [experimental design bureau] have one characteristic in common—high efficiency and reliability.

Some History

Solution of this main problem—providing the country with a reliable, efficient aircraft, one that is technologically efficient in production and simple in operation—has been ensured by an integrated approach to the project planning. The collective has tried to find the best correlations between the parameters and characteristics of an aircraft, looked for efficient solutions persistently and creatively, and maintained close contact with all the institutions and organizations taking part in a future aircraft's development. And this has ensured the success and long service life of the aircraft.

Even now, 35 and 40 years after they were developed, one can see short-range piston-driven Il-12 and Il-14 aircraft in flight. The Il-18, representing the first generation of Soviet gas turbine airliners, has been the most widely used and economical turboprop, in service for more than a quarter century. The Il-62 and Il-62M turbojets, which can accommodate from 138 to 186 passengers, depending on the length of the route, have been flying the longest mainline routes for 20 years.

The best traditions established during S. V. Ilyushin's life are being carefully maintained and developed now in the OKB under the leadership of his student and successor, Chief Designer and Academician Genrikh Vasilyevich Novozhilov.

The First Wide-Bodies

Development of the USSR's first wide-bodied airliner, the 350-seat Il-86, and its entry into service on several air routes right away began a new stage of quality in the work of the OKB imeni S. V. Ilyushin. The course of events—the increasing volume of passengers, first of all, especially on medium-range routes—made it necessary to develop this aircraft. The use of aircraft with relatively small seating capacity created real "overcrowding" in the airspace around airports that were forced to accommodate a large number of

aircraft in short periods of time. In order to alleviate the dangerous traffic density, an aircraft was required which could carry as many passengers as two to four aircraft in the same category.

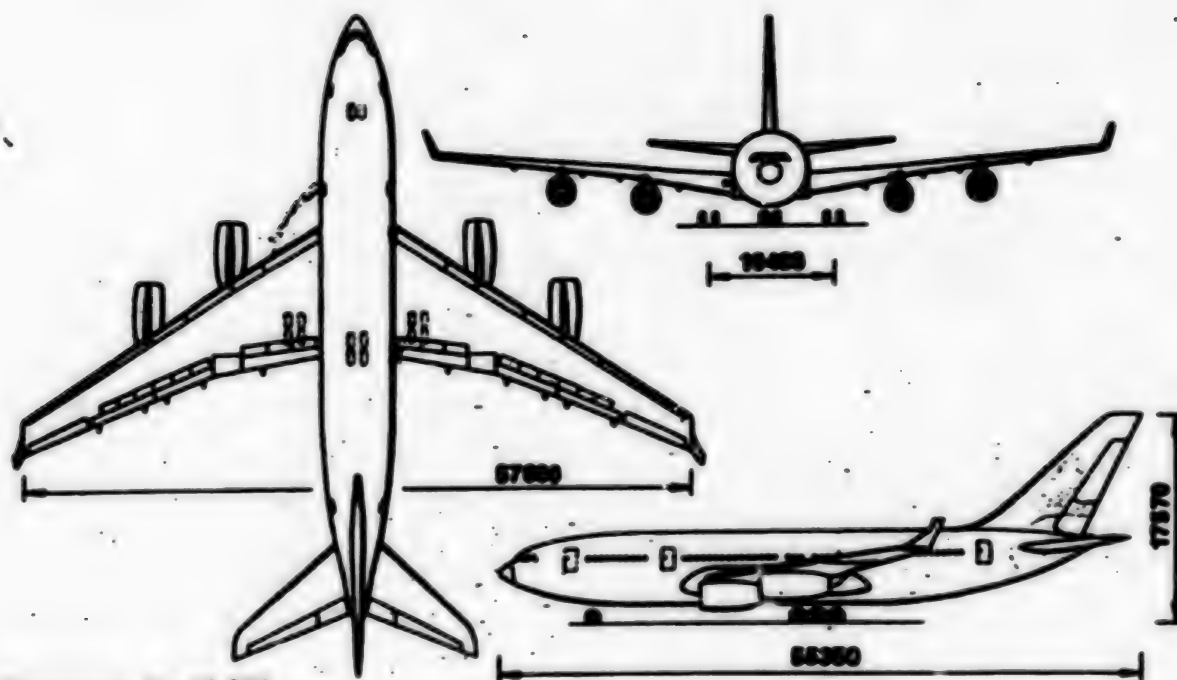
The OKB collective developed the new-generation aircraft in an integrated manner in accordance with tradition, taking into account the increased requirements for its reliability, economic efficiency, and quality of passenger service. They made the most of the experience in developing and operating previous aircraft and the latest achievements in aviation science and technology and production engineering, everything advanced that was available in domestic aircraft manufacturing. A series of studies and experiments was carried out in the stages of preliminary design work in collaboration with scientific organizations, particularly with the TsAGI [Central Aerodynamics Institute imeni N. Ye. Zhukovskiy] and the future component suppliers. On the basis of them they determined the basic design of the airliner and its configuration, using the "carry-on baggage plus containers" system, and its dimensions, weight and flight characteristics. The atmosphere of creativity and active search for the best design solutions, confirmed by 130 patents, contributed to successful resolution of the problems of safety, reliability, and operating efficiency.

The Long-Range Mainline Wide-Body

Enriched by experience in the design, construction, and regular operation of its first wide-body, the medium-range Il-86, the OKB imeni S. V. Ilyushin began development of its "younger brother," the long-range Il-96-300 wide-body. This aircraft of the near future is designed to carry 300 passengers, baggage and cargo with a combined weight of up to 40 tons on domestic mainline routes of 4,000 to 9,000 kilometers with the heaviest passenger flows. It is also planned for use on routes of up to 11,000 kilometers with a change in the number of cabin seats. At first it will help on the long-distance mainlines, and later it will replace the Il-62, which has been operated on them since 1967.

The Il-96-300 is a cantilever monoplane with a sweptback low wing. It resembles the Il-86 on the exterior. The fuselage is the same diameter (6.08 meters), but it is 5 meters shorter. The latest methods of calculation and technological achievements have been incorporated in its design, improving the aircraft's technical characteristics, performance, reliability and flight safety. Its overall mass has been reduced and the quality of its exterior surface has been improved.

Special research and experiments conducted by the OKB collective, together with TsAGI specialists, helped in designing a supercritical wing with a high aspect ratio and vertical wingtips, which increase its lift-to-drag ratio. A number of steps were carried out to improve component aerodynamics. In particular, the number of joints was reduced to a minimum by using long panels.



Проектирование Ил-96-300.

Three-View Depiction of the Il-96-300

Specifications

Engines, in tons	4 x 16
Maximum number of passengers	300
Maximum payload, in tons	40
Operational range with 30-ton payload and fuel reserve, in kilometers	9,000
Operational range with 15-ton payload and fuel reserve, in kilometers	11,000
Mass of equipped aircraft, in tons	117
Takeoff mass, in tons	216
Cruising speed, in kilometers per hour	850-900
Takeoff distance required, in meters	2,600
Landing distance required, in meters	1,980
Landing approach speed, in kilometers per hour	260

The best arrangement was found to couple the wing to the fuselage and the engine nacelle pylons. The wing is fitted with efficient high-lift devices: slats extending the entire length of the span, double-slotted inboard flaps and single-slotted outer flaps. Lateral controls—inboard ailerons and spoilers—also were installed in the wing. Combined with the extensive use of more durable metal alloys, composition materials and honeycomb structures, with which the wing's leading and trailing edge assemblies and the doors to the landing gear compartments are made, this has made it possible to develop a wing with a high level of aerodynamic and weight efficiency.

The new aircraft has a tail assembly of the customary configuration. The horizontal section is the same as on the Il-86, but the vertical section is larger as the result of an increase in height of 1.5 meters. This was done to improve directional stability when one engine fails in flight.

In developing the airframe, the operating loads were carefully analyzed, the stress and strain of the structure were simulated with a computer, and the distribution of forces was optimized. This made it possible to reduce the aircraft's weight and ensure its long service life.

The landing gear of the Il-96-300 consists of three main struts with 12 wheels positioned behind the aircraft's center of mass and a forward strut with two wheels in the fuselage nose section. All the wheels are the same size—130 by 48 centimeters—with tire pressure of 11.5 kilograms per square centimeter. This landing gear will enable the aircraft to use the majority of airfields with paved runways.

Four D-90AN turbofan engines with a high-bypass ratio, developed by the collective headed by Chief Designer P. A. Solovyev, are suspended on pylons under the wing. They are special because of their low specific fuel consumption in cruise mode, low noise factor, and automated control system. Each one has a takeoff thrust of 16 tons. The fuel system on the Il-96-300 was developed separately and operates automatically. Each engine is supplied from the feed compartment of its own tank. The compartments are continuously replenished with fuel transferred to them by jet pumps which are practically trouble-free. The aircraft has nine basic torsion-box integral tanks—four in each outer wing section and one in the wing center section.

In Any Weather, Over Any Terrain...

The selection, development and installation of functional systems (there are backups of the most important ones) were subordinate to the achievement of a high level of safety and reliability for the aircraft and its economic efficiency and technical perfection. The majority of those on the Il-96-300 are more refined than those that now exist. The new flight-control and navigation equipment complex with a cathode-ray tube indication system provides for practically full automation of all-weather navigation over any areas in the world and operation under ICAO [International Civil Aviation Organization] Category III (Footnote: Provides for descent and automatic landing without ground visibility);

the crew consists of just three persons—the commander, copilot, and flight engineer. The introduction of such a complex will reduce crew fatigue and improve safety and flight regularity.

The use of more efficient functional systems has made it possible to significantly reduce the aircraft's mass, increase the level of flight automation, and ensure efficiency and safety in operation. The systems installed in the Il-96-300 serve to achieve this objective: a remotely-controlled system for flying the aircraft "in accordance with the forces," an automated system for controlling the high-lift devices, and an integrated system for presenting flight data and information on the operation of all systems on color displays in the cockpit.

The cockpit was designed so that the flight engineer can remain in front of the central console between the aircraft commander and the copilot throughout an entire flight. Use of the latest automated and electronic facilities has made such an arrangement possible.

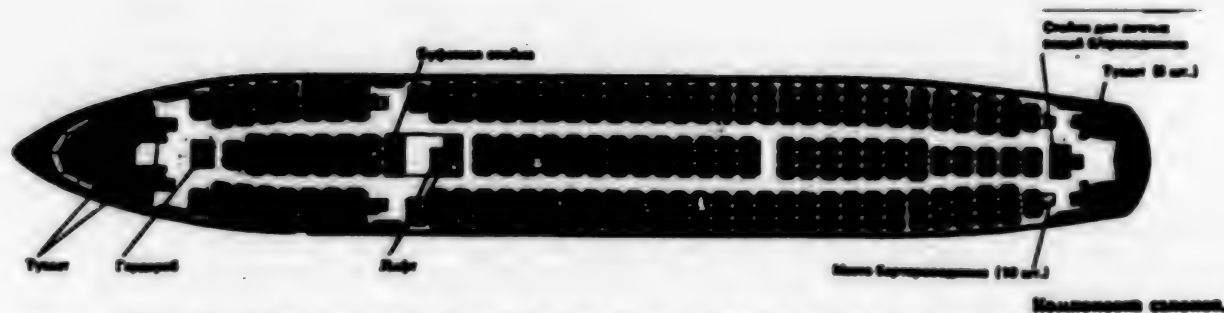
Data displays and units for controlling on-board systems are located in a relatively small area on the instrument panel, the central console and the overhead panel. Information on the operation of on-board systems and the flight-control and navigation status is provided in fully processed form and excludes the possibility of erroneous interpretation. In addition, the "dark cockpit" principle has been utilized for rapid and timely perception of information; throughout a flight, under normal conditions and when on-board systems are functioning accurately, there are no warning signals on the panels and consoles except those which report that systems which operate temporarily have been turned on (a blue light).

The most advanced data display facilities ensure an expeditious change in the type of information determined by flight modes and maintenance of the minimum capacity needed for each of these modes. The information content of the warning and indicator system had the clearness with which the data are presented have been improved through the use of coded lighting. The list of indicating instruments on the Il-96-300 has been reduced by a factor of three.

The Il-96-300 has two decks. Like the Il-86, it is designed to operate in two versions, a 300-seat tourist version and a combined version. The tourist version is the basic one. Seats are positioned in the cabins in three rows of 9 seats each with two aisles. The forward cabin holds 66 passengers and 234 are accommodated in the aft cabin. The cabins are equipped with a video and sound system. The seats have adjustable backs and arm rests which fold back. A small individual table, a fan, and earphones for listening to music programs have been provided. On a long flight, the passengers will be provided with two meals. A galley and kitchen complex has been provided for this on the lower deck.

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Arrangement of Cabins: Tourist Class for 300 seats, Seat Installation Spacing 870 Millimeters

Key:

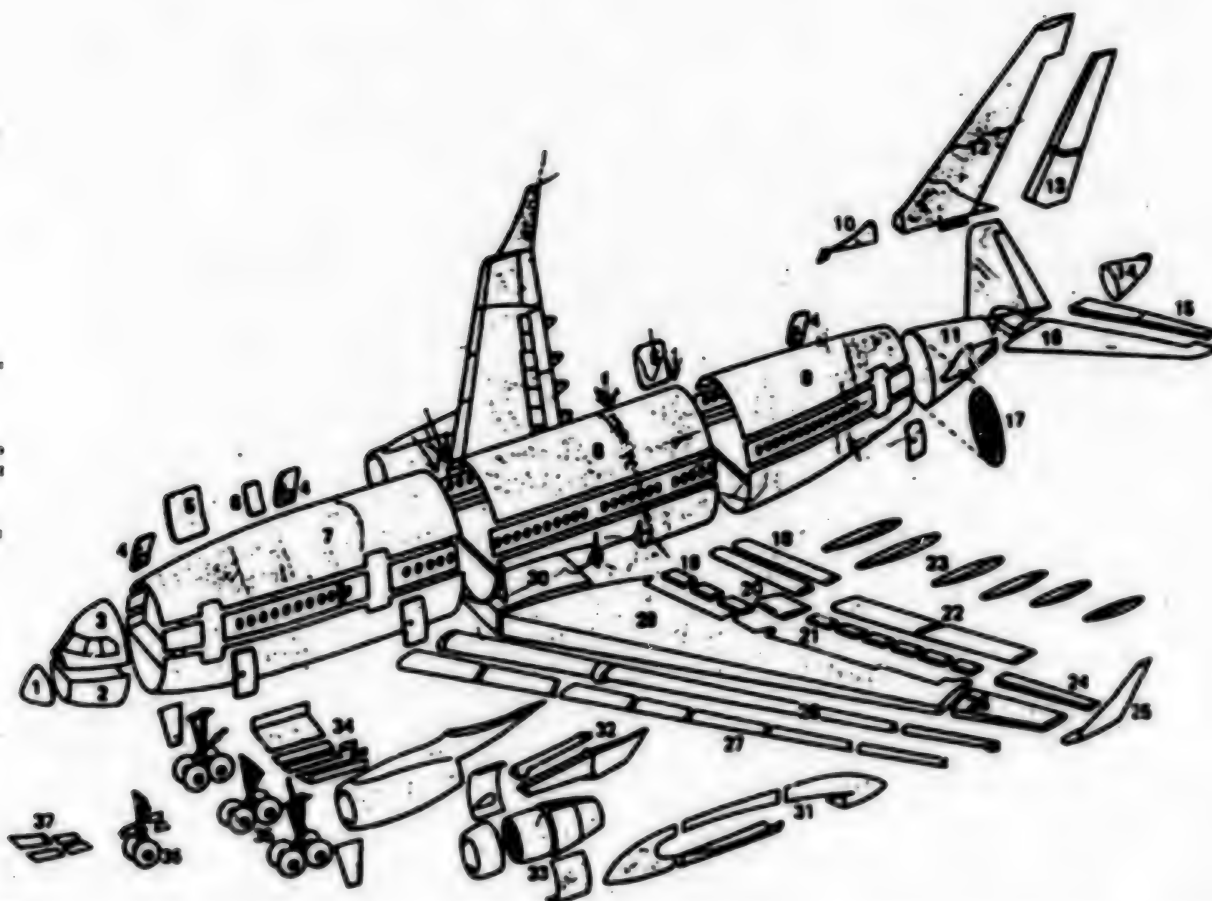
Bottom, left to right: toilet, coat closet, elevator, flight attendants' position (10);

Top, left to right: galley counter, unit for flight attendants' personal effects, toilet to accommodate 6 persons.

Both cabins have fixed coat closets designed for use in the summer. In the cold season, additional closets will be installed by removing seats. In the combined version for 235 seats, it is planned to divide the upper deck into three cabins, with 22 seats in the first one, 40 in the second, and 173 in the third cabin. Additional galley and kitchen equipment will be placed between the first and second cabins.

Two large compartments on the lower deck have been set aside for cargo in standard containers, six in the forward compartment and 10 in the aft compartment. If all seats are filled on the upper deck, passengers' baggage will be carried in nine containers, and mail and priority cargo will be carried in seven of them. The third compartment on the lower deck is basically intended for so-called "individual" items of cargo not in containers.

Before very long, the country's aviation enterprises will be receiving the new comfortable and economically efficient aircraft, which are ready to accommodate thousands of passengers.



Key:

1. Nose cone 2. Lower section of cockpit 3. Canopy 4. Access door 5. Cargo hatch 6. Galley-kitchen door
7. Fuselage nose section (frames 7-40) 8. Fuselage middle section (frames 40-67) 9. Fuselage tail section
10. Forward fin fairing 11. Fin compartment 12. Fin 13. Rudder 14. VSU [Auxiliary power plant] compartment 15. Elevators 16. Stabilizer 17. Pressurized end plate 18. Inboard flaps (double-slotted)
19. Braking flaps 20. Inboard aileron 21. Spoilers 22. Middle and outer flaps (single-slotted) 23. Fairings for flap guide rails 24. Outboard aileron 25. Vertical wingtip 26. Detachable wing torsion box (OChK) 27. Slat section 28. Leading edge of wing 29. Center wing torsion box (SChK) 30. Wing center section
31. Wing-fuselage fillet 32. Pylon 33. Air intake and engine nacelle doors 34. Doors to ventral compartment
35. Main landing gear 36. Nose gear 37. Doors to nose gear compartment

RAIL SYSTEMS

Rail System Semi-Annual Plan Fulfillment *Moscow GUDOK in Russian 21 July 87 pp 1-3*

[TASS item: "The Semi-Annual Results Have Been Summed Up: A Report From the USSR Central Statistical Administration"]

[Text] The USSR Central Statistical Administration Report on the Results in Fulfilling the State Plan for the Economic and Social Development of the USSR During the First Six Months of 1987 says that the country's workers — in carrying out the decisions of the January 1987 CPSU Central Committee Plenum — have joined in the restructuring process more and more actively.

As a result of the adoption of additional measures and the expansion of the application of advanced forms for the management, organization and stimulation of labor, the shortfall, which was tolerated at the beginning of the year, managed to be basically overcome during the second quarter, the intensity of work raised, and a further growth in public production and the Soviet people's standard of living insured during the six months on the whole. During the first half of 1987, industry achieved the production growth rates that had been provided for in the calculations for the plan for this time frame. The productivity of social labor grew by 2.3 percent when compared with the first half of 1986, and by 3.5 percent during the second quarter; the produced national income increased by 2.4 and 3.6 percent, respectively.

The entire increase (14 billion rubles) in industrial output was obtained based on the increase in labor productivity. A total of 2.8 billion more rubles of fixed capital was commissioned from state capital investments than during the first half of last year.

The increase in the people's prosperity is continuing. The average monthly wage of workers and employees increased by 2.8 percent; the payment for the labor of kolkhoz members — by four percent; and payments and benefits to the population from public consumption funds — by 3.9 billion rubles. More housing valued at 5.1 million square meters was constructed.

However, restructuring is only just coming around in many sectors of the national economy; the shortfall, which was tolerated at the beginning of the year in the work of a number of branches, was overcome slowly — especially in machine building, rail transport and construction. The problem of satisfying the population's growing demand for goods and services remains an acute one. The retail trade plan was not fulfilled. The foreign trade turnover volume was reduced by four percent. The planned rates of increase in national income were not achieved.

During the first half of the year, 16.5 billion rubles of state capital investments, or 10 percent more than during the corresponding period of last year, were used for the reconstruction and technical reequipping of the national economy.

The development and organization of the production of new systems for automating production in accordance with the Complex Program for the Scientific and Technical Progress of the CEMA Member Countries to the Year 2000 were carried out.

Products, corresponding to the world technical level, exceeded 40 percent of the production volume of the most important types of machine building products. The machine building ministries realized the plan for mastering the production of new generation equipment by 79 percent.

The first practical results of the activity of the inter-branch scientific and technical complexes for technically equipping the national economy's branches were obtained. A number of important indicators of scientific and technical progress were improved in the branch complexes. However, the scales of using basic technology in industry grew at slow tempos.

On kolkhozes and sovkhoses, grain and leguminous crops, which are being cultivated using intensive technologies, have been sown on 35.3 million hectares for the 1987 harvest.

Exactness toward product quality was increased. State acceptance, which has been introduced at 1,500 enterprises, each month rejected 90 million rubles of products on the average, or 0.8 percent of the produced items. Products totalling approximately 40 million rubles were once and for all rejected as defective during the first half of the year.

The necessary attention is not being paid to the timely assimilation of capacities. On the average, capacities were used 82 percent. As a result of the shortfall in assimilating and using capacities, products totalling 500 million rubles were not received.

Approximately 7 million tons of fuel equivalents, 0.9 million tons of ferrous rolled metal and more than 1 million tons of cement were saved. The drawing of secondary resources into the economic turnover was expanded.

At many enterprises, economic work is being intensified, the practice of establishing direct long-term economic ties is being expanded, and delivery discipline is being strengthened.

The assets, which are being allotted for the social development of labor collectives, are being mastered better than during the first half of last year. However, the advantages of the new economic mechanism, full cost accounting and self-financing are still not being fully realized.

In a number of enterprises, a tense financial situation has taken shape in connection with the failure to fulfill delivery obligations and with the significant sizes of fines paid. Of the industrial ministries whose enterprises work under full cost accounting and self-financing conditions, the profit plan was only fulfilled by the USSR Ministry of the Automotive Industry. One of the reasons for this is the slow reduction in production costs.

A total of 76 percent of the industrial enterprises fully managed their contract obligations.

The output of industrial products grew during the second quarter by 4.4 percent; and based on the results of the first six months as a whole — by 3.5 percent, as was prescribed for this period. The half-year quotas were fulfilled for the extraction and production of the most important types of fuel and energy resources. The above-plan extraction of oil, including gas condensate, was 3.7 million tons, and that of natural gas — 6.7 billion cubic meters. In the coal industry, USSR Ministry of Coal Industry enterprises mined 8.8 million tons of coal above the plan. At the same time, approximately half of the coal mining associations did not cope with their contract obligations.

The metallurgical complex enterprises fulfilled the plan for the production of the main types of items, except for steel pipes. A total of 338,000 tons of steel and 461,000 tons of prepared rolled products were produced and two million tons of iron ore were mined above the plan. The output of products in the assigned assortment — advanced highly efficient types of metal products that are primarily needed in machine building — was not provided for.

In the ministries of the machine building complex, the output of many types of advanced products was increased during the first half of the year. At the same time, a majority of the ministries did not provide for the fulfillment of planning quotas for the production of the main types of machinery and equipment. The semi-annual plan for the production of rolling, blast-furnace and smelting equipment; diesel locomotives; freight cars; large electrical machinery; mainline electric locomotives; metal-cutting machine tools; and forge press machinery was not fulfilled. The shortfall in the production of chemical and oil and gas refinery equipment and equipment for processing polymeric materials was not overcome.

The planned rates of increase in the production volume of machine building were not achieved.

In the enterprises of the chemical and lumber complex, output grew and the fulfillment of the plan for the production of mineral fertilizer and newsprint was assured. The production of a number of advanced and highly efficient types of products was increased. At the same time, the planned production volumes of synthetic resin and plastics, including polyvinylchloride and pipes and pipe-line items made of thermo-softening plastic material, were not provided for. The plan for the production of sulfuric acid, synthetic ammoniate, caustic soda, merchantable industrial wood, and lumber was not fulfilled.

It further says in the USSR Central Statistical Administration report that, during the first half of the year, the overall volume of consumer goods production (less alcoholic beverages) was 141 billion rubles in retail prices; that was four percent higher than during the first half of last year. A number of ministries had a shortfall in fulfilling the plan for the production of consumer goods in general.

Having fulfilled their quotas for the production of the main types of products, the USSR Ministry of Light Industry associations and enterprises failed to deliver to specific consumers products totalling 0.6 billion rubles during the first half of the year.

The introduction of the new management mechanism in the branches of the agroindustrial complex had a positive effect on work results. The total output of agriculture increased by four percent in comparison with the same period of last year, and labor productivity increased by five percent in the public farms sector.

Despite the protracted spring, agricultural enterprises managed the spring field work. Areas sown for the 1987 harvest reached 210.7 million hectares, including 117.6 million hectares sown with grain and leguminous crops. The areas sown with corn, cotton, sunflowers, and annual grass crops were expanded.

Purchases of hothouse-greenhouse and early open-ground vegetables was 1.2 million tons during the first half of the year. This was 11 percent less than for the same period of 1986. The semi-annual plan for deliveries to the all-union stock of vegetables was fulfilled by 93 percent.

In animal husbandry, the production of meat increased by seven percent, that of milk — by two percent, and that of eggs — by three percent when compared with the corresponding period of last year. The farms of the Ukrainian, Azerbaijan, Moldavian and Tajik SSRs reduced milk production.

At the present time, 29 agroindustrial combines and associations and six agrofirms, which are closely coordinating the production, procurement, processing, and sales of agricultural products and which are working on

the principles of full cost accounting, are functioning in the agroindustrial complex. The brigade and family contract continues to be expanded on kolkhozes and sovkhozes.

The food industry enterprises of the agroindustrial complex produced: 5.9 million tons of meat (industrially processed); 1.8 million tons of sausage items; 799,000 tons of animal oil; 16.3 million tons of whole milk products in terms of milk; 2.8 million tons of food and fish products, including canned fish; 821,000 tons of margarine products; 1.6 million tons of vegetable oil; 2.4 million tons of confectionery items; 6.8 billion standard cans of preserves; 78 million decaliters of mineral water; and 274 million decaliters of nonalcoholic drinks. In comparison with the corresponding period of last year, the output of vodka and liquor items was reduced by 19 percent and that of beer — by three percent.

During the half year, fewer tractors, fodder gathering combines, row reapers, and press crop collectors than prescribed by the plan were delivered to the agroindustrial complex.

A total of 25 billion rubles of capital investments were sent to expand the agroindustrial complex, including the branches that supply agriculture with the means of production; 20 billion rubles of these went to agriculture.

The commissioning of fixed capital at the expense of state capital investments was increased by six percent and reached 48.5 billion rubles, 83 percent of the first semi-annual plan. A total of 77.2 billion rubles of state

capital investments, or 95 percent of the allocation established for this period, were assimilated. Their volume grew by six percent when compared with the corresponding period of last year.

The plans for commissioning mainline gas pipelines and oil and oil product pipelines and the capacities of turbine power stations and for the production of steel piping, synthetic resins and plastics, caustic soda, lumber, furniture, and fabric for household linen and underwear were not fulfilled.

The plan for contract work during the first half of the year was fulfilled by 99 percent. The volume of work grew by five percent and labor productivity increased by 4.3 percent.

However, the USSR Central Statistical Administration report says that changes did not occur in capital construction in the direction of considerably increasing the effectiveness of capital investments and construction. The time frames for building projects exceed the norm and the number of projects being simultaneously built continues to be significant.

The shipping volume (dispatching) of freight using all types of general use transport reached 6.3 billion tons and was somewhat more than during the first half of last year; passenger traffic exceeded 500 billion passenger-kilometers and grew by 2.4 percent. Freight shipments and passenger traffic of the individual types of general use transport are described by the following data:

	Fulfilled during 1st 6 months of 1987	Percent of plan fulfillment	1st six months of 1987 as % of 1st 6 months of 1986
Shipment (dispatching) of freight, millions of tons			
Rail transport	1982	98	98
Sea transport	121	102	99.4
River Transport	254	102	99
Motor transport	3317	100.5	102
Pipeline transport—oil and oil products	329	101	103
Gas (USSR Ministry of Gas Industry)	270	102	106
Passenger traffic, billions of passenger-kilometers			
Rail transport	179	102	101
Air transport	89	102	104

Rail transport fulfilled the semi-annual plan for shipping bituminous coal, coke, oil and oil products, ore, cement, mineral fertilizer and other cargo. The shortfall, which existed at the beginning of the year was not overcome. The plan for the overall shipment of cargo was underfulfilled by 39 million tons, including metalwork, lumber cargo, granular slag, refractory material, industrial raw material, molding material, flux, and ferrous metals. A total of 22 railroads, especially the Volga, West Siberian,

Southeastern, Donetsk, and Kuybyshev, lagged behind according to this indicator. Labor productivity grew by 6.2 percent. The use of rolling stock worsened. Violations of the schedule for freight and passenger trains were not eliminated. In June alone, 13.8 percent of the passenger trains (less the suburban ones) arrived at their destinations late; the average time that a train was late reached 1.3 hours. Sea transport fulfilled the plan for transporting cargo overseas by 102 percent. There was a

shortfall in dispatching cargo on coastal trips; the Danube, Azov, Kamchatka, and Caspian steamship companies did not manage their quotas.

Passenger departures, passenger traffic, and the shipment of individual goods were lower than planned on river transport.

Air transport carried 53 million passengers. All administrations and production associations in Civil Aviation, with the exception of the North Caucasus Administration, fulfilled the passenger turnover plan. Aerial chemical operations were conducted on 57 million hectares of agricultural and forest land.

In motor transport, the ministries of motor transport in the Uzbek SSR, Moldavian SSR, Turkmen SSR, and the Ukrainian SSR and the Ministry of Motor Transport and Highways in the Estonian SSR did not cope with their quotas for carrying freight.

The income from carrying passengers on general use buses and in light taxis reached 3.9 billion rubles, or 102 percent of the plan.

The intensity of using trucks was reduced: Their productivity in terms of freight carrying capacity tons and average daily runs fell, and the percentage of empty runs grew.

Communications enterprises fulfilled the plan for income from their major activity; compared with the corresponding period of last year, they were increased by eight percent.

During the first half year of 1987, 118 million workers and employees were employed in the national economy — 0.5 percent more than during the first half of last year.

The average monthly monetary pay of workers and employees reached 200.5 rubles as opposed to 195 rubles during the corresponding period of last year. Payment for the work of kolkhoz members in the public farm sector of the kolkhozes was 147 rubles as opposed to 142 rubles during the first six months of 1986.

In the production branches of the national economy, new conditions for paying for labor were introduced using the assets earned by the labor collective. At the same time, opportunities for increasing wages at the expense of this source are being realized slowly. Tariff rates and position rates of pay were increased for only 11 percent of the total number of workers subject to transfer to the new payment conditions during 1987.

The retail commodity turnover of state and cooperative trade reached 165.2 billion rubles and grew by 3.2 percent when compared with the corresponding period

of 1986 in comparable prices. The commodity turnover plan was not fulfilled both for total volume and without the sale of alcoholic beverages in general by all the union republics except the Estonian SSR.

Positive changes in the structure of the retail commodity turnover were continued — the sale of food items and nonfood goods increased and that of alcoholic beverages was reduced. The trade in potatoes and fruit and vegetable products was somewhat improved. However, their variety remains limited.

The strain in supplying the population with meat products and animal fat remains.

Serious shortcomings exist in satisfying the demand for industrial items. An acute shortage of footwear is being experienced.

The population is not being satisfactorily supplied with construction materials, especially local ones.

The population is being provided with services requiring payment valued at 25.3 billion rubles; this is 45 percent of the annual plan. The volume of services has grown by 10.5 percent.

On 1 July 1987, more than 3,000 cooperatives for the production of consumer goods, in public catering and for providing various services to the population were established.

The amounts of housing, social and cultural construction have grown. Due to state capital investments, 35.1 million square meters of housing area, or 17 percent more than during the first half of 1986, were commissioned.

The number of hospitals and dispensary and polyclinic establishments was increased. Along with this, the health care material and technical base, the quality of medical services and the supplying of the population with medicine needs considerable improvement.

The workers of the Soviet Union have greeted with hearty approval the decisions of the June 1987 CPSU Central Committee Plenum on radically restructuring the management of the economy. Preparations are being made to introduce the USSR Law on State Enterprises (Associations) and to reorganize the organizational structure and work of management agencies. The socialist competition of the labor collectives to fulfill the 1987 plan successfully and to greet the 70th anniversary of the Great October Socialist Revolution in a fitting manner is being expanded.

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